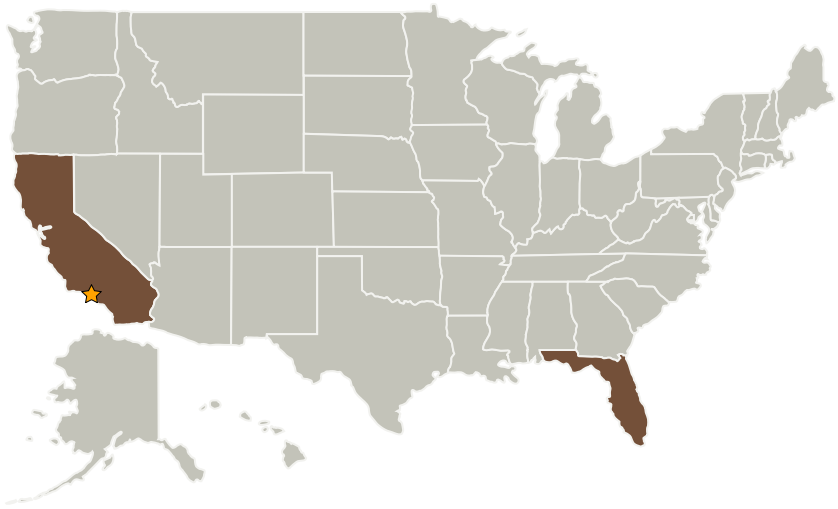
# An Active Thermal Control System for Extreme Environments, Phase I

Completed Technology Project (2008 - 2008)

## Project Introduction

Venus retains many secrets pertaining to its formation and evolution. NASA is interested in expanding its ability to explore the deep atmosphere and surface of Venus through the use of long-lived balloons and landers. Survivability in extreme high temperatures and high pressures is also required for deep atmospheric probes to giant planets. This Phase I proposal discloses technology that will permit operation and survivability in high-temperature/high-pressure planetary environments such as Venus. The goal of this Phase I effort is to demonstrate the feasibility of a very high temperature thermal control system and to experimentally demonstrate a 1251 kJ/Kg thermal storage medium. The successful completion of such an effort requires dramatic advances in technology, areas in which Mainstream has tremendous experience and has excelled in the past. However, although no extremely high temperature heat rejection system has ever been fabricated anywhere in the world, this critical requirement is necessary to achieve long-life operation on Venus and other planets. This effort represents a major leap over the current state of the art, and Mainstream is uniquely suited to perform this task.

## Primary U.S. Work Locations and Key Partners

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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Jet Propulsion Laboratory (JPL)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

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| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| ★Jet Propulsion Laboratory(JPL) | Lead Organization | NASA Center | Pasadena, California |
| Mainstream Engineering Corporation | Supporting Organization | Industry | Rockledge, Florida |

| Primary U.S. Work Locations | |
|---|---|
| California | Florida |

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

Robert Scaringe

## Technology Areas

**Primary:**

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.6 Extreme Environments Related to Critical System Health Management